

REMARKS

Method claims 26-33 have been canceled. Claims 2, 3, 14 and 20 are pending and claims 15-19 and 21-25 are withdrawn as being directed to a non-elected species. Applicants submit arguments for overcoming the rejections based on the prior art of record and respectfully submit that the present application is in condition for allowance.

Restriction Requirement

The Examiner has requested restriction between Group I claims 2, 3 and 14-25 drawn to a sputtering target and Group II claims 26-33 drawn to a method of making a sputtering target.

Applicants confirm the election of the Group I claims, 2, 3 and 14-25 for prosecution in the present application. Method claims 26-33 have been canceled.

Species Election

The Examiner has requested election of a single species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Claims 2 and 3 are generic and the six species are (i) claims 14 and 20; (ii) claims 15 and 21; (iii) claims 16 and 22; (iv) claims 17 and 23; (v) claims 18 and 24; and (vi) claims 19 and 25.

Applicants confirm the election of the species in which Zr is the primary component of the sputtering target. Thus, claims 2, 3, 14 and 20 are readable on the elected species and are presented for prosecution on the merits in the present application, and claims 15-19 and 21-25 are withdrawn. Claims 2 and 3 are generic.

Claim Rejections - 35 USC 103(a)

In the Office Action, the Examiner rejects claims 2, 3, 14 and 20 under 35 USC 103(a) as being obvious over the publication of Mathaudhu et al. titled “Progress in Consolidation of Amorphous Zr-based Powder into Bulk Metallic Glass” in view of U.S. Patent Application Publication No. 2003/0126804 A1 of Rosenflanz et al. in further view of the publication of Gu et al. titled “Structure of Shear Bands in Zirconium-Based Metallic Glasses Observed by Transmission Electron Microscopy”.

The Examiner readily admits that the primary reference, Mathaudhu et al., fails to disclose a sputtering target, the structure of a sputtering target, or anything in the nature of sputtering and targets used to form thin films, and certainly fails to disclose a high quality sputtering target suitable for forming films of complex shapes in the field of nanotechnology. Further, the Examiner readily admits that Mathaudhu et al. fails to disclose a sputtering target having a “target structure” with an average crystallite size of 1nm to 5nm, or 1nm to 2nm. Accordingly, the disclosure of Mathaudhu et al. reference has significant deficiencies relative to the requirements recited by the claims of the present application.

In the Office Action, these deficiencies of Mathaudhu et al. are stated as being met based on combinations of isolated disclosures from an unrelated pair of secondary references, namely, Rosenflanz et al. and the Gu et al..

Applicants respectfully submit that the above stated rejection is improper for being based on hindsight and should be withdrawn. The claims of the present application are not obviated by a fair reading of the references.

The Federal Circuit has repeatedly warned against using an applicant’s disclosure as a blueprint to reconstruct the claimed invention out of isolated teachings in the prior art. See, for instance, Grain Processing Corp. v. American Maize-Products, 840 F.2d 902, 5 USPQ2d 1788

(Fed. Cir. 1988). A critical step in analyzing the patentability of claims pursuant to a §103 rejection is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one “to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.”

Further, the mere fact that references can be combined or modified does not render the resultant combination obvious. See MPEP §2143.01 and In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

In the present Action, Rosenflanz et al. is cited simply for its reference to “sputtering targets” in general. The Office Action cites page 8, Paragraph No. 0083, of Rosenflanz et al. which states:

“[0083] Other techniques for … forming amorphous material include vapor phase quenching, … Vapor phase quenching can be carried out, for example, by sputtering, wherein the metal alloys or metal oxide sources are formed into a sputtering target(s) which are used. . .”

Applicants respectfully submit that there is no fair disclosure, suggestion, teaching, or motivation provided by the above referenced vague statement in Rosenflanz et al. to direct one of ordinary skill in the art to produce a sputtering target from the material disclosed by the Mathaudhu et al. publication. Mathaudhu et al. fail to provide any teaching to one of ordinary skill in the art that its material might be useful in constructing a sputtering target. Similarly, Rosenflanz et al. also fail to disclose to one of ordinary skill in the art that a material of sintered gas atomized powder could be used to produce a sputtering target. One of skill in the art would

use conventional techniques to produce the sputtering targets referenced by Rosenflanz et al. and is not taught otherwise by the cited prior art references.

Further, the Gu et al. publication is also required in the obviousness rejection because, as readily admitted by the Examiner, neither Mathaudhu et al. nor Rosenflanz et al. teach, disclose or suggest a sputtering target having a “target structure” with an average crystallite size of 1nm to 5nm, or 1nm to 2nm.

The Gu et al. publication is directed very specifically to an investigation of so-called “shear bands” produced in bulk metallic glass specimens by bending the specimens. The specimens of Gu et al. are produced by conventional arc-melting techniques and are deformed by being bent along a sharp metal edge to a bending angle of about 150°. The bent specimens are partially flattened and are then examined. So-called shear bands are produced in the metallic glass specimens as a result of the bending. In the region where the shear bands are closely spaced, Gu et al. state that “particles with the average size of 3nm” exist and “have a narrow distribution, mostly ranging from 2-5nm.” See page CC7.9.3 of the Gu et al. publication.

Gu et al. clearly fail to disclose anything relative to sputtering targets or materials of any kind obtained by sintering gas atomized powder. Gu et al. relate to specimens produced by conventional arc welding techniques. The bulk metallic glass of Gu et al. is neither produced according to the process disclosed by the Mathaudhu et al. reference nor that required by the claims of the present application.

In addition, Gu et al. fail to disclose a “target structure” having an average crystallite size of 1nm to 5nm, or 1nm to 2nm. Rather, Gu et al. merely refer to “regions where shear bands are closely spaced”. Shear bands are not relevant to the present invention nor to the disclosure

provided by the Mathaudhu et al. publication. Accordingly, Applicants respectfully submit that it is improper to pick and choose particle size measurements within regions of closely spaced shear bands listed by Gu et al. and combine these measurements with the disclosure of Mathaudhu et al. to obviate the claims of the present application.

Applicants respectfully submit that one of ordinary skill in the art would have had no reason for combining Gu et al. with Mathaudhu et al.. First, the references relate to materials produced by different methods (arc welding v. powder consolidation). Second, Gu et al. is only concerned with bending specimens and shear bands formed due to the bending. Mathaudhu et al. provide no disclosure at all with respect to bending specimens or to shear bands. Accordingly, the particle size in the “regions where the shear bands are closely spaced” as disclosed by Gu et al. is completely irrelevant to Mathaudhu et al. because the material of Mathaudhu et al. doesn’t disclose shear bands.

Finally, in the Office Action it is argued that it would be obvious to modify Mathaudhu et al. in view of Gu et al. for purposes of improving ductility. However, ductility is not a property of concern with respect to the sputtering targets of the present invention. Thus, for this additional reason, one of ordinary skill in the art attempting to produce a sputtering target according to the present invention would have no reason to modify Mathaudhu et al. in view of Gu et al..

Applicants respectfully submit that it would be a serious error to conclude that the present invention as claimed in the present application would have been obvious to one of ordinary skill of the art at the time the invention was made. It would not be obvious to produce a sputtering target structure from the material of Mathaudhu et al. based merely on the isolated vague

teaching of Rosenflanz et al., and it would not be obvious to provide such a target structure with an average crystallite size required by the claims of the present application simply because Gu et al. discloses a 3nm particle size and a 2-5nm particle size distribution within a region of a specimen having closely spaced shear bands produced by bending. Applicants submit that this rejection merely relies on isolated teachings in the prior art and uses Applicants' own disclosure as a blueprint to piece the three unrelated prior art teachings together as required by the claims. It is only Applicants' own disclosure that teaches how to reconstruct the invention of the present application out of the isolated vague random teachings in the prior art. Such a reconstruction is not provided by the prior art when taken by itself.

For all of the above stated reasons, Applicants respectfully submit that the above cited references fail to fairly disclose the invention required by the claims of the present application. Accordingly, Applicants respectfully submit that the claims of the present application are patentable and are non-obvious over the cited prior art combination of references. Applicants request reconsideration and removal of the rejection for these reasons.

Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,
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